First Hit

End of Result Set

L21: Entry 2 of 2 File: DWPI Dec 10, 1993

DERWENT-ACC-NO: 1994-018761
DERWENT-WEEK: 199403
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TITLE: Car count system for car park - finds presence of car by comparing number of pixels in output image of television camera with preset value NoAbstract

PATENT-ASSIGNEE: NEC CORP (NIDE)

PRIORITY-DATA: 1991JP-0312866 (November 28, 1991)

Search Selected Search ALL Clear

PATENT-FAMILY:

	PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
☐	JP 05324954 A	December 10, 1993		004	G06M007/00

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 05324954A	November 28, 1991	1991JP-0312866	

INT-CL (IPC): G06F 15/62; G06F 15/70; G06M 7/00; H04N 7/18

CHOSEN-DRAWING: Dwg.1/3

DERWENT-CLASS: T01 T04 T05
EPI-CODES: T01-J10B2; T04-D02; T04-D04; T05-A02;

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-324954
(43)Date of publication of application : 10.12.1993

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(51)Int.CI.
G06M 7/00
G06F 15/62
G06F 15/70
G06F 15/70
H04N 7/18

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(21)Application number : **03-312866**
(22)Date of filing : **28.11.1991**
(71)Applicant : **NEC CORP**
(72)Inventor : **TSUCHIYA MITSUO**

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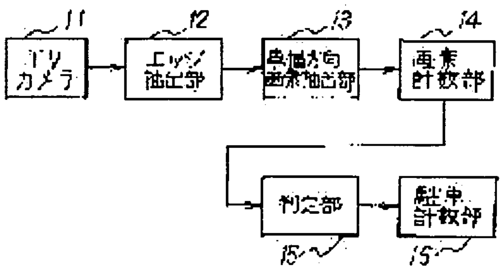
(54) DEVICE FOR COUNTING THE NUMBER OF PARKED CARS

(57)Abstract:
PURPOSE: To surely judge the presence/absence of automobiles parked in a parking area without being affected by weather or the like.
CONSTITUTION: An edge extraction part 12 generates an edge image by performing edge extraction processing to a judge area previously set in the respective parking areas of parking lot images photographed by a TV camera 11. An automobile breadthwise direction picture element extraction part 13 generates automobile breadthwise direction edge images by extracting picture elements in the automobile breadthwise direction based on the edge images. A picture element count part 14 counts the number of edge picture elements in the automobile breadthwise direction in each judge area. When the number of edge picture elements in the automobile breadthwise direction exceeds the number of edge picture elements of a judge reference, a judge part 15 judges the presence of automobiles in the parking area. A parked automobile count part 16 counts the number of automobiles parked in the parking lot.



LEGAL STATUS

[Date of request for examination]	12.12.1997
[Date of sending the examiner's decision of rejection]	30.11.1999
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	
[Date of registration]	
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	
[Date of extinction of right]	

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CLAIMS

[Claim(s)]
[Claim 1] A number counter of parking characterized by providing the following. A TV camera which photos a parking lot A means to perform an edge extract to each judgment field beforehand set up in each parking field of a parking lot image which this TV camera photoed, and to generate an edge image A means to extract an edge pixel of the cross direction of each of said parking field based on said edge image, and to generate a cross direction edge image A means to compare a means which carries out counting of the number of edge pixels of said cross direction for said every judgment field with the number of edge pixels of said cross direction and the number of criteria set up beforehand, and to judge existence of an automobile in said each parking field

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[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] Especially this invention relates to the number counter of counting parking of the number of parking based on the image of the parking lot photoed with the TV camera about the number counter of parking.
[0002]
[Description of the Prior Art] TV camera 21 with which the conventional number counter of parking photos a parking lot as shown in drawing 3 , The judgment field brightness test section 22 which measures the average of the brightness of each pixel of the judgment field beforehand set up in the parking field surrounded with the white line based on the parking lot image which the TV camera photoed, counting which carries out counting of the parking number of a parking lot to the judgment section 24 which measures the criteria field brightness test section 23 which measures the average of the brightness of each pixel of the criteria field beforehand set up outside the parking field, and the brightness of a judgment field and the brightness of a criteria field, and judges the existence of the automobile in each parking field -- it has the section 25.
[0003]
[Problem(s) to be Solved by the Invention] In the conventional number counter of parking mentioned above, the brightness of a judgment field and the brightness of a criteria field were measured based on the parking lot image which the TV camera photoed, and the existence of the automobile in each parking field is judged by measuring this brightness. However, since brightness is changed sharply, it is easy to produce a mistake by the weather, the color of an automobile, etc. at the time of the existence judging of an automobile, and there is a trouble that an error occurs in the number of parking.
[0004] The purpose of this invention is to offer the number counter of parking which can ensure the existence judging of an automobile, without being influenced of the weather etc.
[0005]
[Means for Solving the Problem] A means for a number counter of parking of this invention to perform an edge extract to each judgment field beforehand set up in each parking field of a parking lot image which a TV camera which photos a parking lot, and this TV camera photoed, and to generate an edge image, A means to extract an edge pixel of the cross direction of each of said parking field based on said edge image, and to generate a cross direction edge image, It has a means to compare a means which carries out counting of the number of edge pixels of said cross direction for said every judgment field with the number of edge pixels of said cross direction and the number of criteria set up beforehand, and to judge existence of an automobile in said each parking field, and is constituted.
[0006]
[Example] Next, this invention is explained with reference to a drawing.
[0007] TV camera 11 which drawing 1 is the block diagram showing one example of this invention, and photos a parking lot, As opposed to the judgment field beforehand set up in each parking field of the parking lot image which the TV camera photoed The edge extract section 12 which performs edge extract processing and generates an edge image, The cross direction pixel extract section 13 which extracts the pixel of the cross direction based on an edge image, and generates a cross direction edge image, the pixel which carries out counting of the number of edge pixels of the cross direction for every judgment field -- counting -- parking which carries out counting of the parking number of a parking lot to the judgment section 15 which compares the section 14 with the number of edge pixels of the cross direction and the number of criteria set up beforehand, and judges the existence of the automobile in each parking field -- counting -- it has the section 16.
[0008] Here, the edge extract section 12 computes the differential value of the brightness of the adjoining pixel to the parking lot image which the TV camera photoed, and extracts an edge. Such edge extract processing is well-known.
[0009] Now, drawing 2 (a) shows an example of the parking lot image which TV camera 11 photoed, and drawing 2 (b) shows an example of the cross direction edge image which the cross direction pixel extract section 13 outputs. by the way, the edge pixel of the cross direction of the automobile parked when an automobile parks a car at a parking field extracted from the parking lot image since anterior part or a posterior part was photoed at least -- using it -- the existence judging of an automobile -- it can do. Furthermore, since it can avoid that unnecessary images, such as dirt and a crack, are extracted as an edge by avoiding dirt, a crack, etc. in a parking field when setting up a judgment field, judgment precision can be improved.
[0010] Thus, counting of the number of parking can be carried out correctly, without being influenced of the weather etc. by judging with the automobile having parked a car in a parking field, when the pixel of the cross direction is extracted based on an edge image, counting of the number of edge pixels of the cross direction is carried out for every judgment field and the number of edge pixels of this cross direction exceeds the number of criteria.
[0011]
[Effect of the Invention] Perform edge extract processing to the judgment field which was beforehand set up in each parking field of the parking lot image which the TV camera photoed according to this invention as explained above, and an edge image is generated. By extracting the edge pixel of the cross direction based on this edge image, carrying out counting of the number of edge pixels of the cross direction for every judgment field, and judging the existence of the automobile in each parking field with the number of edge pixels of this cross direction Like before, since it does not judge with the brightness of

an image, the judgment mistake by weather change, the color of an automobile, etc. decreases, and it has the effect that counting of the number of parking can be carried out correctly.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing one example of this invention.
[Drawing 2] It is an example of the image for explaining actuation of this example, and (a) shows an example of the parking lot image which the TV camera photoed, and (b) shows an example of the edge image of the cross direction.
[Drawing 3] It is the block diagram showing an example of the conventional number counter of parking.
[Description of Notations]
11 TV Camera
12 Edge Extract Section
13 Cross Direction Pixel Extract Section
14 Pixel -- Counting -- Section
15 Judgment Section

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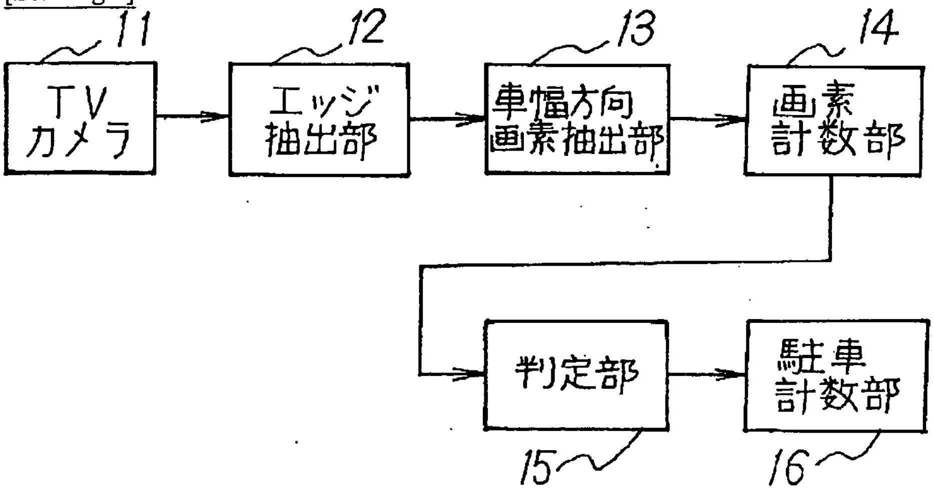
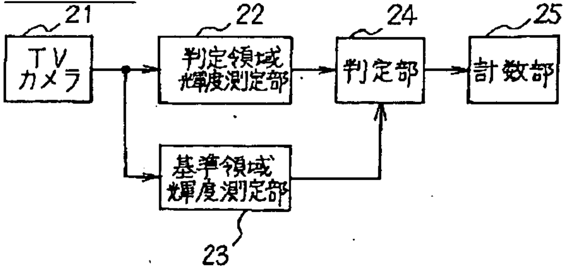
DRAWINGS

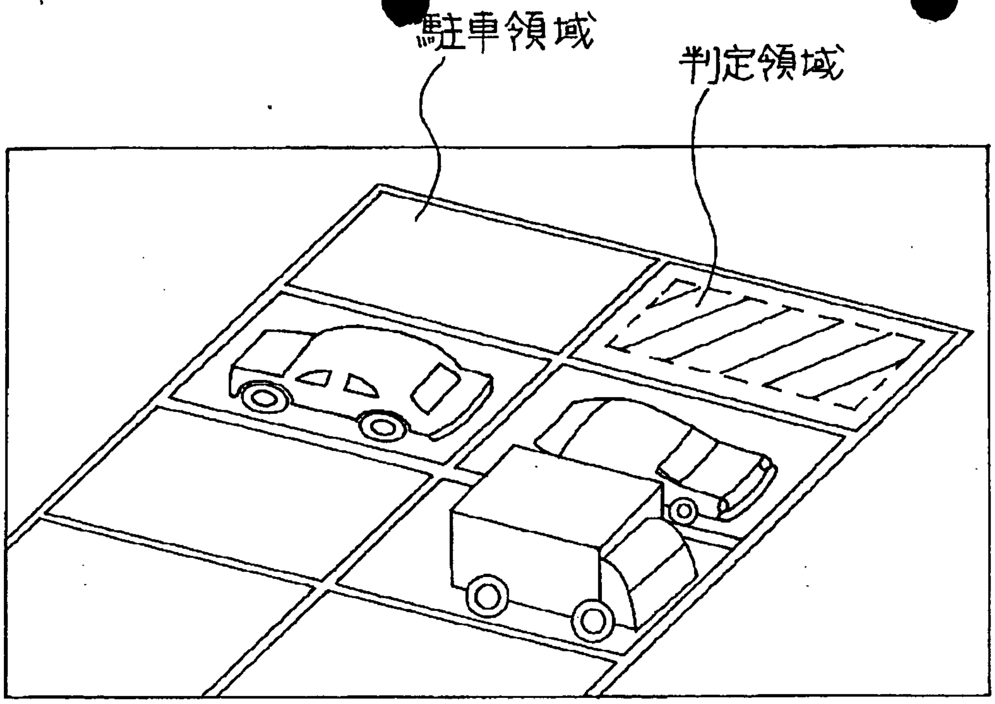
[Drawing 1]


11
TV
カメラ
12
エッジ
抽出部
13
車幅方向
画素抽出部
14
画素
計数部
判定部
15
駐車
計数部
16

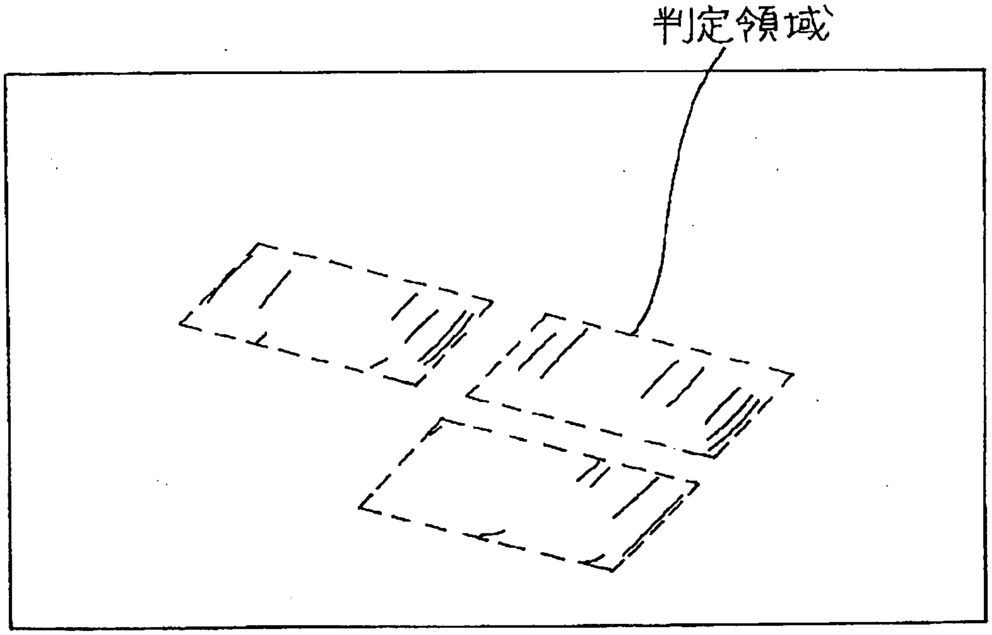
[Drawing 3]


21
TV
カメラ
22
判定領域
輝度測定部
24
判定部
25
計数部
基準領域
輝度測定部
23

[Drawing 2]



(a)



(b)

[Translation done.]

(19)日本国特許庁（ＪＰ）

(12) **公開特許公報**（A）

(11)特許出願公開番号
特開平5－324954

(43)公開日　平成５年(1993)12月10日

(51)Int.Cl.^{5}	識別記号	庁内整理番号	F I	技術表示箇所
G06M　7/00	N	6843−2F		
G06F　15/62	380	9287−5L		
15/70	330　H	9071−5L		
	460　F	8837−5L		
H04N　7/18	C			

審査請求　未請求　請求項の数１（全　４　頁）

(21)出願番号　　特願平3－312866

(22)出願日　　平成３年(1991)11月28日

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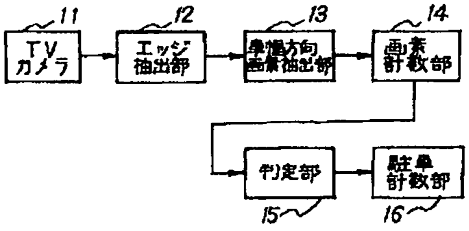
(74)代理人　弁理士　京本　直樹　（外２名）

(54)【発明の名称】　駐車台数計数装置

(57)【要約】

【目的】天候等の影響を受けることなく駐車領域内に駐車している自動車の有無を確実に判定できようにする。

【構成】エッジ抽出部１２は、ＴＶカメラ１１が撮影した駐車場画像の各駐車領域内に予め設定した判定領域に対して、エッジ抽出処理を行ってエッジ画像を生成する。車幅方向画素抽出部１３は、エッジ画像を基に車幅方向の画素を抽出して車幅方向エッジ画像を生成する。画素計数部１４は、各判定領域毎に車幅方向のエッジ画素数を計数する。判定部１５は、車幅方向のエッジ画素数が判定基準数を超える場合に駐車領域内に自動車有と判定する。計数部１６は、駐車場の駐車台数を計数する。



【特許請求の範囲】

【請求項１】　駐車場を撮影するＴＶカメラと、このＴＶカメラが撮影した駐車場画像の各駐車領域内に予め設定した各判定領域に対してエッジ抽出を行ってエッジ画像を生成する手段と、前記エッジ画像を基に前記各駐車領域の車幅方向のエッジ画素を抽出して車幅方向エッジ画像を生成する手段と、前記各判定領域毎に前記車幅方向のエッジ画素の数を計数する手段と、前記車幅方向のエッジ画素数と予め設定した基準数とを比較して前記各駐車領域内の自動車の有無を判定する手段とを備えることを特徴とする駐車台数計数装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は駐車台数計数装置に関し、特にＴＶカメラで撮影した駐車場の画像を基に駐車台数を計数する駐車台数計数装置に関する。

【０００２】

【従来の技術】従来の駐車台数計数装置は、図３に示すように、駐車場を撮影するＴＶカメラ２１と、ＴＶカメラが撮影した駐車場画像を基に、白線で囲まれた駐車領域内に予め設定した判定領域の各画素の輝度の平均値を測定する判定領域輝度測定部２２と、駐車領域外に予め設定した基準領域の各画素の輝度の平均値を測定する基準領域輝度測定部２３と、判定領域の輝度と基準領域の輝度とを比較して各駐車領域内の自動車の有無を判定する判定部２４と、駐車場の駐車台数を計数する計数部２５とを備えている。

【０００３】

【発明が解決しようとする課題】上述した従来の駐車台数計数装置では、ＴＶカメラが撮影した駐車場画像を基に判定領域の輝度および基準領域の輝度を測定し、この輝度を比較することによって各駐車領域内の自動車の有無を判定している。しかし、天候や自動車の色等によって輝度は大きく変動するため、自動車の有無判定時にミスが生じ易く、駐車台数に誤差が発生するという問題点がある。

【０００４】本発明の目的は、天候等の影響を受けることなく自動車の有無判定を確実に行うことができる駐車台数計数装置を提供することにある。

【０００５】

【課題を解決するための手段】本発明の駐車台数計数装置は、駐車場を撮影するＴＶカメラと、このＴＶカメラが撮影した駐車場画像の各駐車領域内に予め設定した各判定領域に対してエッジ抽出を行ってエッジ画像を生成する手段と、前記エッジ画像を基に前記各駐車領域の車幅方向のエッジ画素を抽出して車幅方向エッジ画像を生成する手段と、前記各判定領域毎に前記車幅方向のエッジ画素の数を計数する手段と、前記車幅方向のエッジ画素数と予め設定した基準数とを比較して前記各駐車領域内の自動車の有無を判定する手段とを備えて構成されている。

【０００６】

【実施例】次に本発明について図面を参照して説明する。

【０００７】図１は本発明の一実施例を示すブロック図であり、駐車場を撮影するＴＶカメラ１１と、ＴＶカメラが撮影した駐車場画像の各駐車領域内に予め設定した判定領域に対して、エッジ抽出処理を行ってエッジ画像を生成するエッジ抽出部１２と、エッジ画像を基に車幅方向の画素を抽出して車幅方向エッジ画像を生成する車幅方向画素抽出部１３と、各判定領域毎に車幅方向のエッジ画素数を計数する画素計数部１４と、車幅方向のエッジ画素数と予め設定した判定基準数とを比較して各駐車領域内の自動車の有無を判定する判定部１５と、駐車場の駐車台数を計数する駐車計数部１６とを備えている。

【０００８】ここで、エッジ抽出部１２は、ＴＶカメラが撮影した駐車場画像に対して、隣接する画素の輝度の微分値を算出してエッジを抽出する。このようなエッジ抽出処理は公知である。

【０００９】さて、図２（ａ）はＴＶカメラ１１が撮影した駐車場画像の一例を示しており、図２（ｂ）は車幅方向画素抽出部１３が出力する車幅方向エッジ画像の一例を示している。ところで、自動車が駐車領域に駐車した場合、駐車している自動車の少なくとも前部または後部を撮影できるので、駐車場画像から抽出した車幅方向のエッジ画素を使用して自動車の有無判定できる。更に、判定領域を設定するときに、駐車領域内の汚れや亀裂等を避けることにより、汚れや亀裂等の不要な画像がエッジとして抽出されるのを回避できるので、判定精度を向上できる。

【００１０】このようにして、エッジ画像を基に車幅方向の画素を抽出し、各判定領域毎に車幅方向のエッジ画素数を計数し、この車幅方向のエッジ画素数が判定基準数を超える場合に駐車領域内に自動車が駐車していると判定することにより、天候等の影響を受けることなく正確に駐車台数を計数できる。

【００１１】

【発明の効果】以上説明したように本発明によれば、ＴＶカメラが撮影した駐車場画像の各駐車領域内に予め設定した判定領域に対してエッジ抽出処理を行ってエッジ画像を生成し、このエッジ画像を基に車幅方向のエッジ画素を抽出し、各判定領域毎に車幅方向のエッジ画素数を計数し、この車幅方向のエッジ画素数により各駐車領域内の自動車の有無を判定することにより、従来のように、画像の輝度により判定をしないので、天候変化や自動車の色等による判定ミスが低減し、駐車台数を正確に計数できるという効果を有している。

【図面の簡単な説明】

【図１】本発明の一実施例を示すブロック図である。

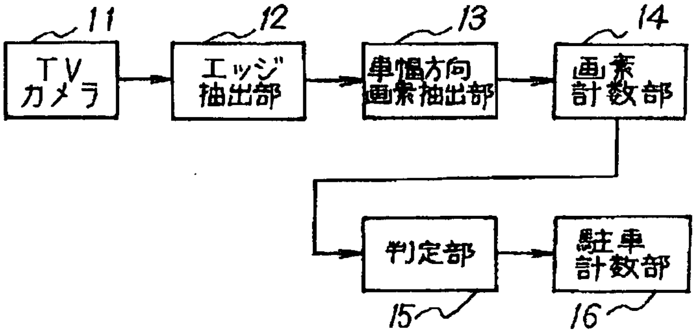
【図２】本実施例の動作を説明するための画像の一例であり、（ａ）はＴＶカメラが撮影した駐車場画像の一例を示し、（ｂ）は車幅方向のエッジ画像の一例を示している。

【図３】従来の駐車台数計数装置の一例を示すブロック図である。

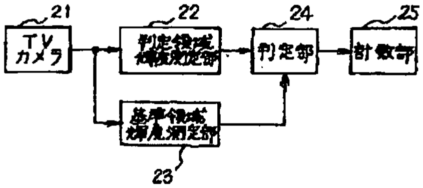
【符号の説明】

１１	ＴＶカメラ
１２	エッジ抽出部
１３	車幅方向画素抽出部
１４	画素計数部
１５	判定部

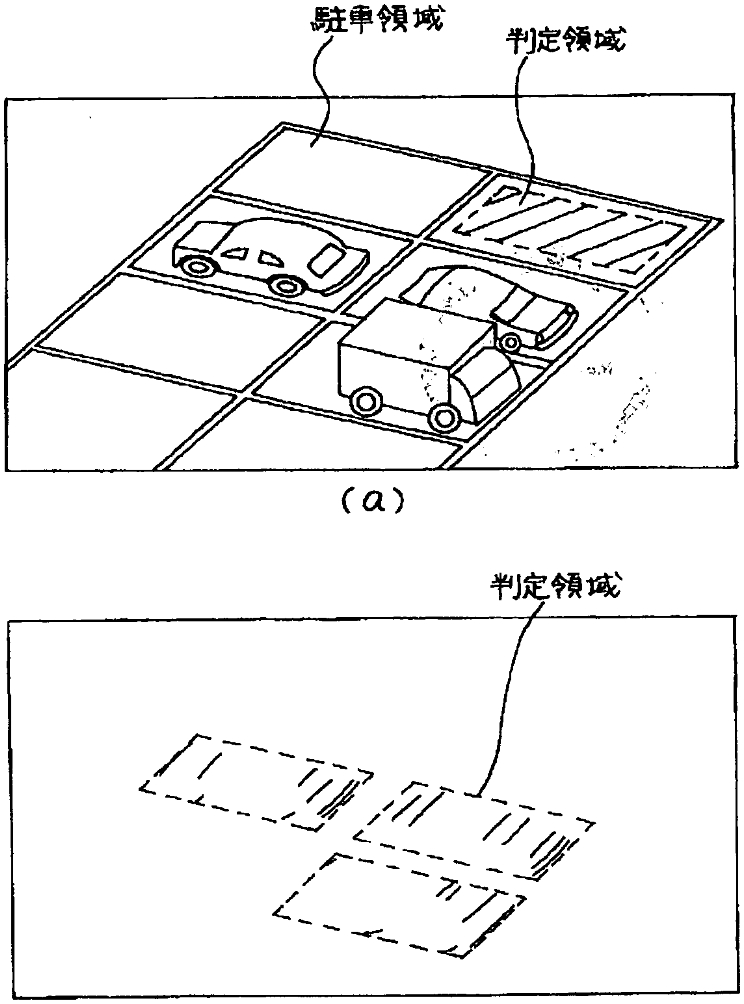
【図１】


11
TVカメラ
12
エッジ抽出部
13
車幅方向画素抽出部
14
画素計数部
判定部
15
駐車計数部
16

【図３】


21
TVカメラ
22
判定領域輝度測定部
24
判定部
25
計数部
基準領域輝度測定部
23

【図２】


駐車領域
判定領域
判定領域

（a）

（b）